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ROOT ROTS OF CEREALS IN THE PRAIRIE PROVINCES

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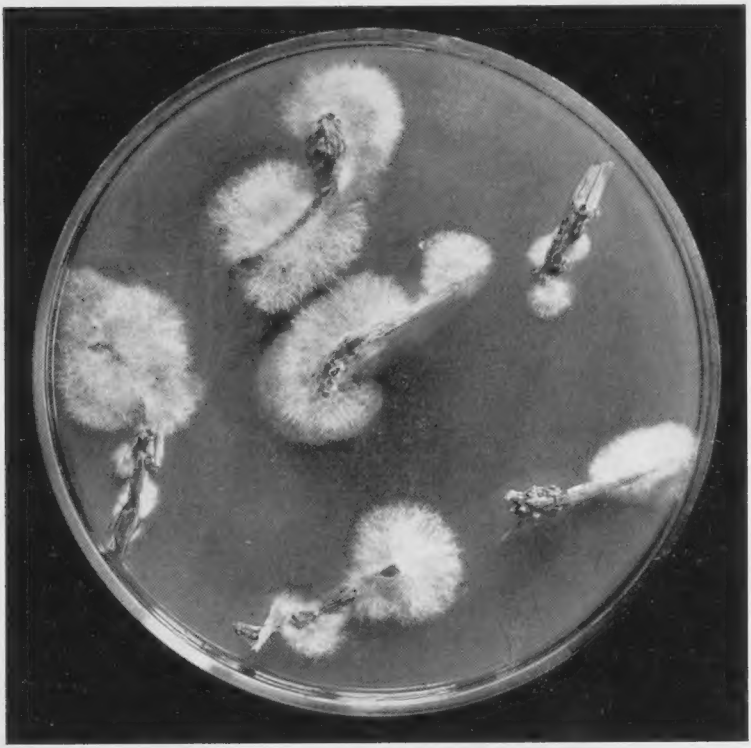

Root-rotting fungi growing out of pieces of the roots, crowns, and lower stems of wheat plants affected by Common Root Rot.

INTRODUCTION

Cereal root rots are caused by soil-inhabiting fungi. These fungi attack the roots, crowns and stem bases of the plants. They cause enormous losses annually in Western Canada. Many farmers often attribute these losses to other causes such as drought injury, wireworm damage, alkali injury, and unfavourable climatic and soil conditions.

Three distinct root rots attack cereal crops in the Prairie Provinces. These are: (1) Common root rot, (2) Browning root rot, and (3) Take-all. This circular gives a brief description of these diseases and outlines the more important measures for their control.

COMMON ROOT ROT

Common root rot is the most widespread and destructive root disease of cereals in Western Canada. It is present every year and in all the grain-growing districts, and affects all grain crops. As a rule, it is most prevalent in the southern districts of the Prairie Provinces.

Description. Common root rot is caused by several different fungi. It attacks both seedlings and mature plants. As a "seedling blight" it may kill off many seedlings before they reach the surface of the soil, and those that survive develop into unthrifty plants. Many of these young plants wilt and die. Stands of grain affected by seedling blight are usually thin. On older plants, common root rot causes distinct brown lesions on the roots, crowns, and bases of the stems. Diseased plants are less vigorous than healthy ones, and produce fewer and smaller kernels. If these plants ripen prematurely, and many of them do, they usually produce few or no kernels at all. The fungi responsible for common root rot may be carried by the seed.

Control. Common root rot is difficult to control. Summerfallowing is beneficial, and crop rotation should be practiced. Seed treatment with an organic mercury dust will prevent seedling blight, the early phase of this disease. Losses from common root rot can be reduced by sowing grain crops not too thickly or deeply, and at the earliest feasible date. Agricultural practices which favour rapid, vigorous growth of a grain crop tend to reduce the damage caused by this disease. The use of varieties possessing some resistance to common root rot is recommended.

BROWNING ROOT ROT

Browning root rot is practically confined to wheat, particularly to wheat on summerfallow. It is usually found on land which has long been under cultivation, and in soils with a low phosphate content. It may reduce the yield of wheat as much as 10 bushels per acre. Oats and barley may be attacked if grown after fallow.

Description. From about the second week of June till the first week of July large areas of many of the wheat crops on fallow in the

Prairie Provinces will be seen to turn yellowish-brown in colour. Although this trouble is often attributed to drought, wind, or frost injury, it is of fungous origin. The disease is characterized by a browning of the leaves when the plants are about 3 to 4 weeks old. If the roots of the affected plants are examined it will be found that the tips of the crown roots are brown and rotted, and that many of the primary roots are diseased. Affected plants lack vigor and mature late; and thus, when "browning" is prevalent, damage from frost and leaf rust is increased, and weeds have a good opportunity to develop. Browning root rot usually appears in large patches. In severe cases, however, it may involve the whole field.

CONTROL. The best, single, practical control measure for browning root rot is the application of ammonium phosphate (11-48). This is best applied at seeding time by using a fertilizer attachment to the seed drill. Twenty pounds per acre are recommended for the drier areas and 30 to 40 pounds where moisture conditions are more favourable. Barnyard manure may also be used to reduce the damage. It should be applied just before summerfallow ploughing, and at the rate of from 10 to 12 tons per acre.

TAKE-ALL ROOT ROT

Take-all is principally a disease of wheat, and is of chief importance in the park or semi-wooded areas of the Prairie Provinces. In this country it rarely attacks barley and rye, and has not been found attacking oats.

DESCRIPTION. This disease is definitely of fungous origin. It is most prominent when the plants are from 8 to 10 inches high. Take-all is characterized by a yellowing of the leaves. Affected plants are stunted, develop few tillers, and ripen prematurely. The heads, when formed, are severely bleached (white-heads), and contain only a few, if any, kernels. There is always a distinct blackening and rotting of the roots, crowns, and stem bases, and the plants are easily pulled from the soil. On new land, the disease appears in rather large patches; while on older land, affected plants may be scattered throughout the field. The fungus responsible for take-all is not carried by the seed, but lives over winter in cereal stubble and in the roots of cultivated and wild grasses.

CONTROL. Crop rotation will give effective control of take-all. If this disease appears in the second or third crops on new land, or after grass crops, do not sow wheat the following year. Instead, sow a resistant crop such as oats or flax, or else summerfallow the field.

Use a suitable crop rotation for the district, and get rid of persistent grass plants. Rotation must be depended upon to starve-out the fungus.

The three cereal root rots, common root rot, browning root rot and take-all, are often difficult to identify in the field. Farmers will be well advised to submit specimens of diseased plants to the Dominion Laboratory of Plant Pathology at Winnipeg, Saskatoon or Edmonton, or directly to Line Elevators Farm Service, Winnipeg.

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